

## Hit List

|               |                     |       |          |           |
|---------------|---------------------|-------|----------|-----------|
| Clear         | Generate Collection | Print | Fwd Refs | Bkwd Refs |
| Generate OACS |                     |       |          |           |

Search Results - Record(s) 1 through 9 of 9 returned.

☐ 1. Document ID: US 6916368 B2

AB: A curable film-forming composition is provided that on curing produces a coating, comprising in a medium (i) 10 to 90 percent by weight based on the total weight of resin solids in the film-forming composition of a crosslinking agent; (ii) 10 to 90 percent by weight based on the total weight of resin solids in the film-forming composition of a polymer containing a plurality of functional groups reactive with the crosslinking agent; and (iii) 20 to 85 percent by volume based on the total volume of the film-forming composition of particles having a mean particle size less than 100 nm. The particles further have an index of refraction sufficiently similar to that of the polymer of (ii) to minimize haze, and have an affinity for the medium sufficient to keep the particles suspended therein. The affinity of the particles for the medium is greater than the affinity of the particles for each other, thereby preventing agglomeration of the particles within the medium. The film-forming compositions exhibit improved scratch (mar) resistance compared to compositions of the prior art, as well as improved sag resistance when compared to similar coating compositions prepared without the particles.

A multi-component composite coating composition is also provided. The coating composition comprises a pigmented film-forming composition serving as a base coat and a clear film-forming composition serving as a transparent topcoat over the base coat. The transparent topcoat, or clear coat, is derived from the curable film-forming composition described above.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KAMC | Draw Des |
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☐ 2. Document ID: US 6635341 B1

AB: Coating compositions formed from at least one hydroxyl functional non-vinyl material comprising at least one alcoholic hydroxyl group blocked with a hydrolyzable silyl group, and at least one curing agent are provided by the present invention. Another embodiment of the present invention is directed to a coating composition formed from components comprising at least one carbamate functional material comprising at least one carbamate group blocked with a hydrolyzable silyl group, and at least one curing agent. Another embodiment of the present invention is directed to a coating composition formed from components comprising at least one carboxyl functional material comprising at least one carboxyl group blocked with a hydrolyzable silyl group, and at least one curing agent. Another embodiment of the present invention is directed to a coating composition, formed from components comprising at least one amide functional material comprising at least one amide blocked with a

hydrolyzable silyl group, and at least one curing agent. Other embodiments of the present invention are directed to substrates coated with the aforementioned cured compositions. Also provided are multi-component composite coatings which include a cured basecoat deposited from a pigmented coating composition and a cured topcoat deposited from a topcoating composition. The multi-component composite coatings of the invention provide highly scratch resistant color-plus-clearcoatings. Further embodiments of the present invention are directed to methods for improving scratch resistance of a substrate.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KWIC | Draw Des |
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☐ 3. Document ID: US 6534568 B1

AB: Powder coating or adhesive formulations include as a component thereof a silane of formula (I) or hydrolyzates or condensates thereof  
##STR1##

where R.sup.1 is a hydrocarbon, acyl, alkylsilyl, or alkoxy-silyl group, R.sup.2 is a monovalent hydrocarbon group; R.sup.3 is alkylene, optionally interrupted with one or more ether oxygen atoms; a is 0 or 1; Z is a direct bond or a divalent linking group; X is an m-valent organic group or H; and m is 1-20. The silanes are useful as crosslinkers, property modifiers and/or adhesion promoters. Powder adhesives may be similarly formed with the silanes of formula (I). Fillers or pigments, such as titanium dioxide fillers, which are treated with silanes, especially silanes having alkyl, epoxy, acryl, methacryl, polyether, amino, acid anhydride, hydroxyalkyl, carbamate or ureido functionality, may also be usefully employed in powder coating formulations.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KWIC | Draw Des |
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☐ 4. Document ID: US 6375789 B1

AB: Powder coating formulations include as a component thereof a silane formula I: ##STR1##

where R.sup.1 is a hydrocarbon, acyl, alkylsilyl or alkoxy-silyl group; R.sup.2 is a monovalent hydrocarbon group; R.sup.3 is alkylene, optionally interrupted with one or more ether oxygen atoms; a is 0 or 1; Z is a direct bond or a divalent organic linking group; X is an m-valent organic group or H; and m is 1-20. The silanes are useful as crosslinkers, property modifiers and/or adhesion promoters. Powder adhesives may be similarly formed with silanes of formula I.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KWIC | Draw Des |
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☐ 5. Document ID: US 6319311 B1

AB: Powder coating formulations which include as a component thereof a silyl carbamate of the formula: ##STR1##

where R.sup.1 is a hydrocarbon or acyl group; R.sup.2 is a monovalent hydrocarbon group; R.sup.3 is alkylene, optionally interrupted with one or more ether oxygen atoms; a is 0 or 1; X is an m-valent organic group; m is 1-6; and, either A=NH and B=O, or A=O and B=NH. The silanes are useful as crosslinkers and/or adhesion promoters.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KMIC | Draw Des |
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☐ 6. Document ID: US 6080825 A

AB: The present invention provides a curable coating composition that includes at least three components. The coating composition includes a component (a) that includes one or both of a compound (a)(1) having at least one carbamate group or terminal urea group according to the invention and having at least two linking groups that are urethane or urea or a compound (a)(2) having at least two groups selected from carbamate groups, terminal urea groups, or combinations of the two and at least four urethane or urea linking groups. The second component (b) of the coating composition includes a polymer resin comprising active hydrogen-containing functional groups reactive with the third component (c). The resins is selected from polyester, polyurethane, or polyester-polyurethane copolymers Component (c) of the coating composition is a curing agent that is reactive with the first two components. Preparation of coated articles using the compositions of the invention is also disclosed.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KMIC | Draw Des |
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☐ 7. Document ID: US 6017640 A

AB: Opaquely pigmented or thick filmed powder coatings for heat sensitive substrates, such as wood, wood composites, for example, medium density fiber board, and plastics, that can be fully cured, especially near the substrate, through the incorporation of a dual cure system in the powder comprising a thermal initiator, such as a peroxide, along with a UV initiator. The UV initiator cures the surface, while the thermal initiator cures at the substrate. Surprisingly, virtually no pregelation occurs during the heated melt and flow out step prior to UV curing. Consequently, the hardened film finish formed on the surface exhibits exceptional smoothness which is comparable to that of traditional UV curable powders. The hardened film finish is also fully cured throughout and exhibits exceptional adhesion to the substrate which cannot be achieved with traditional UV curable powders that have been pigmented. Although the dual cure system includes a thermal aspect, these powder coatings are especially suited for coating heat sensitive substrates. The dual thermal and UV curable powders still cure at significantly lower temperatures and

significantly faster rates than traditional heat curable powders to make them safe for coating heat sensitive substrates.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KWIC | Drawn Des |
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☐ 8. Document ID: US 6005017 A

AB: Opaquely pigmented or thick filmed powder coatings for heat sensitive substrates, such as wood, wood composites, for example, medium density fiber board, and plastics, that can be fully cured, especially near the substrate, through the incorporation of a dual cure system in the powder comprising a thermal initiator, such as a peroxide, along with a UV initiator. The UV initiator cures the surface, while the thermal initiator cures at the substrate. Surprisingly, virtually no pregelation occurs during the heated melt and flow out step prior to UV curing. Consequently, the hardened film finish formed on the surface exhibits exceptional smoothness which is comparable to that of traditional UV curable powders. The hardened film finish is also fully cured throughout and exhibits exceptional adhesion to the substrate which cannot be achieved with traditional UV curable powders that have been pigmented. Although the dual cure system includes a thermal aspect, these powder coatings are especially suited for coating heat sensitive substrates. The dual thermal and UV curable powders still cure at significantly lower temperatures and significantly faster rates than traditional heat curable powders to make them safe for coating heat sensitive substrates.

| Full | Title | Citation | Front | Review | Classification | Date | Reference |  |  | Claims | KWIC | Drawn Des |
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☐ 9. Document ID: US 5922473 A

AB: Opaquely pigmented or thick filmed powder coatings for heat sensitive substrates, such as wood, wood composites, for example, medium density fiber board, and plastics, that can be fully cured, especially near the substrate, through the incorporation of a dual cure system in the powder comprising a thermal initiator, such as a peroxide, along with a UV initiator. The UV initiator cures the surface, while the thermal initiator cures at the substrate. Surprisingly, virtually no pregelation occurs during the heated melt and flow out step prior to UV curing. Consequently, the hardened film finish formed on the surface exhibits exceptional smoothness which is comparable to that of traditional UV curable powders. The hardened film finish is also fully cured throughout and exhibits exceptional adhesion to the substrate which cannot be achieved with traditional UV curable powders that have been pigmented. Although the dual cure system includes a thermal aspect, these powder coatings are especially suited for coating heat sensitive substrates. The dual thermal and UV curable powders still cure at significantly lower temperatures and significantly faster rates than traditional heat curable powders to make them safe for coating heat sensitive substrates.